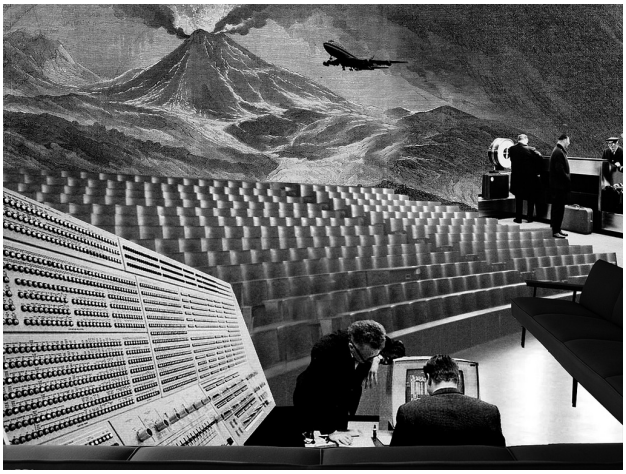
Donald MacKenzie

Donald MacKenzie

A Continent. Inter-view



(image by Nina Jäger, *continent.*)

Donald MacKenzie is Professor of Sociology. He works at the School of Social and Political Science at the University of Edinburgh. He has contributed greatly to discourses in Science and Technology Studies, his early career having evolved research into the sociology of science. His recent research emphasis concerns the origins, development and behavior of relations between social systems and financial markets. MacKenzie has worked on topics ranging from the sociology of reception and production of nuclear weapons, to the meaning of proof in the context of computer modelling systems critical to safety and security. Recent publications include Do Economists Make Markets? On the Performativity of Economics, co-edited with Fabian Muniesa and Lucia Siu (Princeton, 2007) and Material Markets: How Economic Agents are Constructed (Oxford, 2009). His Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance (MIT Press, 1993) was co-awarded the Robert K. Merton Award by the American Sociological Association, and MacKenzie was also awarded this same prize for his book Mechanizing Proof: Computing, Risk, and Trust (MIT Press 2004). He was elected a Fellow of the Royal Society of Edinburgh in 2001 and a Fellow of the British Academy in 2004. His current research is funded by the European Research Council (grant no. 291733).

cc.cc: How did you get here?
DM: Physically, I took a flight from Edinburgh via Amsterdam to Berlin. Intellectually, what I have done throughout most of my academic career is to take aspects of science and technology, very broadly, and understand what really matters to peoples' lives—and try to unpack them, disentangle them, understand how they got to the way they are.

cc.cc: What technical systems are operating on us right now?
DM: The air around us is full of wireless signals, you have what looks like an iPhone. At the moment, we are living our lives in a world saturated by signals of one kind or another. I'm old enough to remember when people were paranoid about electromagnetic radiation and its effects on health. If that really were a concern, we really are being zapped.[1] Just about anybody I know has a wireless router in their apartment or their house, and nobody is worried about it any longer.

cc.cc: What pieces of the technosphere do you have on you?
DM: I have a very old fashioned mobile phone. I also have a pretty cheap, primitive watch, clothing, and of course—I'm from the UK—none of that was manufactured in the UK. Not a single thing is likely to have been made in the UK. Everything that is on me was created by an interconnected production network crossing the globe.

cc.cc: What part of the technosphere do you rely upon the most?
DM: As with most people in the academic profession, it's essentially the structures of the internet that I rely on most heavily.[2] Together with, of course, the computer as a standalone device, together with my mobile phone. But fundamentally yes, the internet is the central thing that I rely upon.[3]

cc.cc: What is the technosphere?
DM: What it means to me is: the interconnected networks of human beings and our artifacts that girdle the globe, that we are all a part of, and that—at least in the UK or Germany—we are all dependent on. If 'it' broke down significantly, we would have nothing to eat. That's what it means to me.

cc.cc: Please pick one image that resonates with your idea of the technosphere.[4]
DM: The one that jumps out for me is this transport picture (a car, a bus, a train and a plane) because I suppose it means two things to me: for one, it means mobility, very obviously. The second thing it means to me is guilt, because I am an academic, and I travel a great deal to do my research and also to come to events such as this. Indirectly, I burn a hell of a lot of carbon doing that. There is a sort of tension in that image for me: I love travel, I love visiting different places, but I can never quite set aside my knowledge of what is being done to the world to make it possible.[5]

cc.cc Notes

[1] EDITORS' NOTE: An intensifying understanding of materiality and interconnectivity across technological systems, environments and beings sensitizes us to the atmospheric, climatic scope of the physical functions of these 'invisible' systems. Intangible functions are recollected as inextricably geographic (and geologic) in nature and behaviour. "But with computers, not humans, doing the trading," writes Donald MacKenzie in his research on high-frequency trading, "geography matters exquisitely. With any of these technologies—fibre-optic cable, microwave, millimetre wave, laser transmission through the atmosphere—the exact route is crucial." Donald MacKenzie "Be Grateful for Drizzle" *London Review of Books* 36, no. 17 (2014): 27–30.

Algorithmic systems now approach a kind of mythological being, like disembodied sprites darting through the ether carrying parcels of data, behave according to material conditions, especially with regard to geographic locations where computational processes are enacted. This atmospheric condition is explored by MacKenzie, Daniel Beunza, Yuval Millo, and Juan Pablo Pardo-Guerra in their "Drilling through the Allegheny Mountains: Liquidity, Materiality and High-Frequency Trading." *Journal of Cultural Economy* 5, no.3 (2012): 279–296. One such strategic form of geographically optimising trading systems is "co-location", where the proximity of servers receiving and outputting information allows for computers to respond faster to the data, "compressing time" to achieve the "speed necessary for high-frequency trading." This compression of time is essential to these trading systems, as MacKenzie writes: "traders at a large distance from matching engines are permanently doomed to learn 'what the price is' much more slowly than those who co-locate. The material assemblages that make possible today's liquid markets are in that sense Einsteinian, not Newtonian." Ten years ago, Paul Virilio declared: "No more duration! No more topography!" Negative Horizon (New York,

Continuum, 2008), 185.

Further, Virilio notes that "progressively doing away with our awareness of distances (cognitive distances), speed, in its violent approach, distances us from sensible realities; the more rapidly we advance toward the terminus of our movement, the more we regress until *speed becomes, in a certain way, a premature infirmity, a literal myopia.*" Ibid., 109.

[2] EDITORS' NOTE: MacKenzie cites Andrew Blum's (2012) *Tubes: A Journey to the Center of the Internet*, describing the physicality of the internet and the atmospheric experience of a data centre. Blum and MacKenzie were both affected by the air inside these financial hermitages, experiencing a sensorial assault by a climate that was cold, and loud. Atmospheric noise is an avatar of invisible markets. The air becomes something dense—radiating with a cosmic hum—this constant becoming makes the atmosphere dense. An awareness of the materiality of these systems makes the complex technospheric matrix more and more evident: a collusion of living matter with the material waste and detritus produced out of informational exchange. The environmental impacts these mechanisms have, and the social systems that necessitate their operations rear their agential heads. From the flickering silicon ecosystems of servers, to the minute gems that form components for human-operated devices, our technologies carve out elements from the earth and, in turn, leave a residue—seductive, mutated sedimentations like fordite. See, for example, Jussi Parikka. A Geology of Media (Minneapolis: University of Minnesota Press, 2015).

[3] EDITORS' NOTE: On the physicality of finance: "Finance's technosphere is deeply daunting. However, its very physicality reveals a certain lack of robustness. For example, the microwave and millimetre wave links among datacentres are sometimes disrupted by the most mundane of physical phenomena: rain. The processes—social, economic, cultural and technological—that have created this astonishing but also surprisingly delicate technosphere are the focus of research I have been conducting since 2010." Donald MacKenzie. "The Microwave Tower of the New York Stock Exchange and the Physicality of Finance." *HKW The Technosphere, Now Reader* (2015): 24.

MacKenzie states in his earlier "Be Grateful for Drizzle" how "Data centres resemble giant warehouses, and their size explains why this trading has shifted from its traditional sites in Manhattan to townships in New Jersey no tourist has ever heard of: real estate is much cheaper there. Data centres often have high-security features, such as a two-door entrance like a spaceship airlock. They're frequently windowless, and sometimes freezingly cold because of the need for fierce air-conditioning to extract the heat generated by the tens of thousands of computer systems they contain. (The small numbers of maintenance workers who are needed can stay in warm rooms unless something goes wrong or new equipment needs to be installed.) Data centres are huge consumers of electricity, and while a single modern computer is close to silent, the combination of tens of thousands packed together, and all the air conditioning, makes for a lot of noise." Op. cit., 27-30.

The materiality of financial systems is also explored by Beatte Geissler and Oliver Sann in a photographic series titled Volatile Smile, (Verlag für moderne Kunst, 2014) documenting the abandoned work stations of exchange workers at Chicago's Willis Tower. The atrophied office shells are littered with blank monitors, revealing the banal imagery of financial infrastructures. In parallel to Geissler and Sann's visual archaeology of the spaces that contain and sustain the seemingly invisible systems of finance, Justin Joque examines the sonic traces of financial systems and their algorithmic workings. In his project, "Listening to the Dow," Joque captures a sonic portrait of the behaviours and fluctuations of the closing value of the Dow Jones Stock Exchange. Justin Joque, "Sonification" *continent.* 1, no. 4 (2011): 239.

[4] EDITORS' NOTE: During the discussions, interviewees were asked to pick from a set of somewhat random images. This collection of different phenomena served as a prompt for thought on the forms of appearance and the visuality of the technosphere. You can view the set here www.flickr.com/photos/57221817@N07/25411316686/in/photostream. The discussion here refers

to www.flickr.com/photos/57221817@N07/25141553990.

[5] EDITORS' NOTE: On the topic of travel, MacKenzie's research on the infrastructures and operations of high-frequency trading also raises the question around the "fairness" of information that *travels* at the speed of light. A faster reading of data is enabled by a proximity of servers to each other; this co-location may be limited (by human or environmental factors), which creates a certain fluctuation in receiving information. This raises the question of "fairness" in trading. For a fun (though perhaps outdated) excursion through questions of time, relativity, and "fairness" in financial trading, see the James Angel's report, "Impact of Special Relativity on Security Regulations," UK Government Office for Science, Foresight Project, The Future of Computer Trading in Financial Markets–DR 15, London (2011), in which Angel writes: "One of the lessons of quantum physics is that occasionally extreme events can and do occur [...] For centuries brokerage firms have located offices as close as possible to the exchange so that they could get their orders into the exchange faster. The only difference is that the orders are now submitted via electrons and not runners. Is it fair that some participants have the resources to spend on co-location that others don't? It is no more unfair than the fact the some investors are endowed with more resources to spend on fundamental research, or better brains for finding good investments."

Donald MacKenzie's Edinburgh–Amsterdam–Berlin flight requires a carbon offset of 0.20 metric tons according to the carbon calculator available through http://www.carbonfootprint.com/.